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Predictors of Competitive Employment for Blind and Visually Impaired Consumers of Vocational Rehabilitation Services

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Abstract: In this study, four variables were found to have a significant association with competitive employment outcomes for blind and visually impaired consumers of vocational rehabilitation services. These variables were the receipt of education as a rehabilitation service that resulted in an educational certificate or degree, having worked since the onset of the disability, reason for applying to vocational rehabilitation related to obtaining a job, and the relationship between the counselor and the consumer being rated as high quality.

People who are visually impaired have traditionally had difficulty obtaining employment. According to the American Foundation for the Blind (n.d.), an estimated 40%-45% of working-age persons who are visually impaired are employed. Although this current estimate is higher than the dismal percentages that have traditionally been reported (Dickerson, Smith, & Moore, 1997), it is still low. It is lower than the estimates for people with other disabilities and much lower than the employment rate of the general population (Kirchner, Schmeidler, & Todorov, 1999). For this reason, there have been numerous studies on the employment of persons who are visually impaired.

Specifically, a considerable amount of research has been conducted on the employment outcomes of visually impaired persons, particularly consumers of vocational rehabilitation services (see, for example, Giesen & Ford, 1986; Giesen et al., 1985; Hill, 1989; Kirchner & Johnson, 1997; Kirchner & Peterson, 1982; Knowles, 1969). Generally, the purpose of this type of research is to determine the consumers' characteristics or variables that are associated with successful outcomes for these consumers. This information can then be used to help providers of rehabilitation services identify consumers who may have more difficulty achieving a successful employment outcome and to intervene to increase the likelihood of successful employment. In addition, if specific service-related factors are identified as being related to successful outcomes,

rehabilitation counselors can use this information to decide which services to provide to consumers. Until recently, the only large source of data on vocational rehabilitation consumers has been the yearly data set published by the federal Rehabilitation Services Administration: the RSA-911 database. Now a longitudinal data set of such consumers has become available for public use: the Longitudinal Study of the Vocational Rehabilitation Services Program (LSVRSP). A multitude of studies are possible with these data, but of particular interest to the field of visual impairment is the issue of competitive employment for consumers of vocational rehabilitation services.

Review of the literature

In one of the earliest studies on employment issues for blind or visually impaired consumers of vocational rehabilitation services, Knowles (1969) used data on 461 legally blind consumers in the Los Angeles area to investigate differences between those whose vocational rehabilitation was successful versus those for whom it was not. He used both univariate and multivariate techniques to analyze his data and determined that the five variables that had the most important relationship to the success of vocational rehabilitation services were good orientation and mobility skills, a high level of vocational classification prior to rehabilitation, a younger age at the onset of visual impairment, a greater number of years of visual impairment, and a younger age at the start of rehabilitation.

Kirchner and Peterson (1982) evaluated the vocational rehabilitation outcomes of visually impaired consumers during fiscal year 1980 using nationwide data on vocational rehabilitation (from the R-300 form, which was the predecessor to the RSA-911 data). Based on comparisons of percentages across these groups, they focused their investigation on consumers whose cases were closed in homemaker status, but included a comparison with those whose cases were closed in competitive employment and sheltered workshops. They found that consumers whose cases were closed in competitive employment were more likely to have a less-severe visual impairment, to have only one disability (visual impairment), to be male, to be younger, not to receive social security benefits, and to be employed at the time of their application for services.

A comprehensive study that addressed the employment outcomes of legally blind consumers of vocational rehabilitation services was conducted by Giesen et al. (1985). In addition to their own analyses, the researchers provided a thorough review of the literature on employment outcomes (through the early 1980s) for

individuals who were blind or visually impaired. Their sample consisted of 619 consumers from four strategically selected state vocational rehabilitation agencies for persons who are blind. The study incorporated approximately 100 potential predictor variables in the stepwise discriminate analysis of types of employment outcomes (competitive, homemaker, sheltered workshop, or unemployed). Of the 52 significant variables that were identified in this analysis, the most important predictors of the types of employment outcomes were (in order of importance) age at the onset of blindness, the rating of the original occupational goal on the total raw score vocational quotient job-difficulty index, expenditures for personal or vocational adjustment training, gender, the primary source of support at referral, the highest grade completed, the receipt of noninstitutional training, the receipt of institutional training (education or business or vocational school training), the receipt of physical restoration services, and the number of additional disabilities. Other variables that also significantly predicted employment were the receipt of social security disability insurance during the rehabilitation process, the number of occupations held prior to referral, the time (in months) from the previous occupation and referral, the length of employment in the previous occupation, and race.

Consumers whose cases were closed in competitive employment were significantly different from those whose cases were closed with other outcomes in the following ways: They were more likely to have personal sources of support at referral, to have had the highest number of years of education at application, to have received more institutional training, to have had the fewest number of additional disabilities, and to have had a higher score on the job-difficulty index for their original vocational goal. Giesen and Ford (1986) conducted a similar study with the same sample of 619 vocational rehabilitation consumers, but focused on persons whose cases were closed as unsuccessful and how they differed from those whose cases were closed in competitive employment, homemaker status, or employment in sheltered workshops.

Hill (1989) conducted a study of the determinants of employment outcomes for blind and visually impaired consumers who were successfully rehabilitated by state vocational rehabilitation agencies. She, like Giesen et al. (1985), investigated the specific categories of successful closure. Using national R-300 data for fiscal year 1982, Hill compared consumers whose cases were closed in competitive employment, in sheltered workshops, and in self-employment with those whose cases were closed as homemakers, using a multinomial logit model.

She primarily evaluated the effects of the characteristics of individual consumers and the vocational rehabilitation services they received on the type of outcome. Overall, the most important predictors of work status were age at the closure of the case and gender, with younger age and being male associated with better employment outcomes. Other variables that specifically predicted competitive closure over homemaker closure were a greater number of years of education completed; a less-severe visual impairment; never having been married; and the receipt of personal adjustment training, on-the-job training, or receiving a college education as a service. The presence of a major secondary disability reduced the likelihood that the consumer's case would be closed in competitive employment, whereas the presence of a minor secondary disability increased the likelihood.

Leonard, D'Allura, and Horowitz (1999) conducted a study of the factors that are associated with employment among blind and visually impaired consumers of vocational placement services from a private rehabilitation organization (Lighthouse International). They collected their data by telephone interview and were able to include many variables that were not available in other analyses of employment outcomes of persons who are blind or visually impaired. They used logistic regression to determine which factors could predict employment at follow-up after the receipt of vocational placement services. Unfortunately, their sample was small ($N = 91$), and their analyses may not have had sufficient power. The only significant predictors in their model were having attended an integrated school, using print as the primary reading medium, and having received technology training. These results may have been different from those of other studies because the researchers had many unique variables to choose from for inclusion in their model and included only those that had the greatest bivariate correlation with employment status. Additional factors may have been that a population other than consumers of vocational rehabilitation services was used and that long-term employment, rather than employment at the closure of the cases, was evaluated.

A study by Kirchner et al. (1999) also used a population other than consumers of vocational rehabilitation services. Using the nationally representative 1994-1995 National Health Interview Survey on Disability (NHIS-D) data, they conducted several analyses that focused on employment in conjunction with age, health, and level of vision loss (blind or legally blind versus other visual impairments). This data was collected by the National Center for Health Statistics. These variables were found to be significantly related to whether a visually impaired person was employed. Kirchner et al. also identified

additional variables that had an influence on employment, such as whether the person had ever worked for pay and whether the person had an additional disability. An "interest in working" was thought to be a potentially important factor in whether individuals were employed, but the NHIS-D database did not include a suitable variable to assess this possibility.

Self-reported health status was found to have a profound effect on employment status, particularly for those who were aged 18-54. When the effects of both health status and multiple impairments were combined for those aged 18-69, the results were dramatic. These results were especially striking for those who are legally blind: only 30% of those who reported excellent or good health and had multiple disabilities were employed, whereas 70% of those who reported excellent or good health and a single disability (blindness) were employed. (It should be noted that 80% of the legally blind persons in this study had multiple disabilities.) The percentages for those with less-severe visual impairments were 56% and 73%, respectively. Using logistic regression, Kirchner et al. (1999) also evaluated the effects of a larger combination of factors on the employment rates of these individuals. They determined that race or ethnicity and education, in addition to age and health, were important predictors of employment. Gender was not found to be a predictor of employment in their model.

The variables that previous students have commonly found to be associated with employment or employment outcomes for blind and visually impaired consumers are gender, educational level, having additional disabilities, work history information, the receipt of financial assistance, level of vision loss, age at the onset of vision loss, and current age, with race sometimes providing relevant information for the analyses (Giesen & Ford, 1986; Giesen et al., 1985; Hill, 1989; Kirchner & Peterson, 1982; Kirchner et al., 1999; Knowles, 1969). I used the results from the prior research in this area to help determine which variables to include in the current analysis. The research question investigated was, Which variables are associated with successful employment outcomes for blind and visually impaired consumers of vocational rehabilitation services? I was also interested in determining the size of the effect (the importance) of each variable on success in achieving competitive employment.

Method

Source of data

The data that I used in the analyses were public-use data obtained from Cornell University's web site for the Longitudinal Study of the Vocational Rehabilitation Services Program (LSVRSP) (School of Industrial and Labor Relations, 2003). The LSVRSP was a large-scale research project initiated by Congress to evaluate the performance of the state-federal vocational rehabilitation program. Data were collected over a five-year period (from January 1995 to January 2000) from more than 8,500 consumers at all stages of the vocational rehabilitation process, from application to three years after their cases were closed.

As the name of the study implies, data were collected from each consumer at more than one point in time, usually for a three-year period. A multistage, complex design was used to select the sample, which resulted in a nationally representative sample of vocational rehabilitation consumers from this period. Data were collected on each consumer's work history, functioning, vocational interests and attitudes, community integration, psychological characteristics, and perspectives on the vocational rehabilitation experience. These data were abstracted from the vocational rehabilitation case records (which included data from the RSA-911 database) and were obtained in personal interviews. This database represents the richest source of information on vocational rehabilitation consumers that has ever been assembled.

Sample

The population of interest in this study was consumers of vocational rehabilitation services who were blind or visually impaired; therefore, only those with a primary or secondary disability code representing vision loss (from 100 to 149) were included in the analysis. Because a competitive employment outcome was the dependent variable, the sample was limited to those aged 65 or younger. The sample was further limited to those who were not competitively employed at the time of their application for services, to determine the effect of vocational rehabilitation on helping consumers to obtain employment, rather than to retain employment. The sample also had to be limited to those for whom data were available on all the variables used in the analysis, which reduced the number of respondents to 181 (weighted count = 20,152). The demographic characteristics of the sample are presented in Table 1.

Begin Table 1:

Table 1

Demographic characteristics of the sample (N = 181; weighted N = 20,152).

Description: There are 4 main column heads: Variable, Frequency, Weighted frequency, and Percentage.

Variable, Gender (male); Frequency: 101; Weighted frequency: 10,643; Percentage: 52.8.

Variable (Age), Younger than 30; Frequency: 44; Weighted frequency: 4,954; Percentage: 24.6.

Variable (Age), 30-39; Frequency: 39; Weighted frequency: 4,691; Percentage: 23.3.

Variable (Age), 40-49; Frequency: 42; Weighted frequency: 4,435; Percentage: 22.0.

Variable (Age), 50-59; Frequency: 34; Weighted frequency: 3,908; Percentage: 19.4.

Variable (Age), 60-65; Frequency: 22; Weighted frequency: 2,163; Percentage: 10.7.

Variable (Race), White; Frequency: 128; Weighted frequency: 14,747; Percentage: 73.2.

Variable (Race), Black; Frequency: 34; Weighted frequency: 2,751; Percentage: 13.65.

Variable (Race), Native American; Frequency: 1; Weighted frequency: 98; Percentage: 0.5.

Variable (Race), Asian or Pacific Islander; Frequency: 2; Weighted frequency: 638; Percentage: 3.2.

Variable (Race), Hispanic; Frequency: 16; Weighted frequency: 1,917; Percentage: 9.5.

Variable, Has a secondary disability; Frequency: 103; Weighted frequency: 11,439; Percentage: 56.8.

Variable, Level of vision loss (blind or legally blind); Frequency: 49; Weighted frequency: 5,729; Percentage: 28.4.

End of Table 1.

Variables

The dependent variable was a successful employment outcome, with success defined as working in competitive employment, self-employment, or supported employment or with the Business Enterprise Program at the time the case was closed. (The

generic term competitive employment is used to describe anyone whose case was closed successfully, as defined here.) Those persons whose cases were closed as homemakers, in a sheltered workshop, or as unpaid family workers were not considered to have had a successful employment outcome.

The LSVRSP is a rich source of data with many interesting options for variables that may be included in a model. The number of variables had to be limited, however, because of the sample size. The 11 independent variables that were used in the analysis were selected on the basis of the results of prior research (that is, gender, age, level of vision loss, the presence of a secondary disability, the receipt of financial assistance, race, and educational level), because they were similar to significant variables that were found in previous research (having worked since the onset of the disability and having received education as a service and the result of this service), or on the hypothesis that they would be related to the cases being closed in employment (reason for applying for services related to seeking employment and the rated quality of the consumer-counselor relationship). Many of these variables or variations of them have been found to be significant predictors of successful employment in prior studies, as discussed in the review of the literature. Nine of these variables were the characteristics of the consumers at the time that they applied for services, and two were directly related to vocational rehabilitation services.

Demographic and personal characteristics

Age and educational level were the only continuous variables in the model. The remaining variables were categorical, primarily dichotomous. Level of vision loss was dichotomous, with those who were totally or legally blind in one group and those with a lesser degree of visual impairment in the other group. The presence of a secondary disability was determined by the codes for major disability and secondary disability. If two different categories of disability (not just two types of visual impairment) were listed for these variables, secondary disability was coded yes for the presence of an additional disability other than visual impairment. Secondary disability has been found to be negatively related to successful outcomes in the past, and it is the variable in this data set that is the most similar to health status, which Kirchner et al. (1999) found has a significant impact on employment. Race was a categorical variable with three levels: white, black, and other. (The "other" races--Asian or Pacific Islander, Native American, and Hispanic--were combined because their numbers were small.) The receipt of financial assistance, assessed at the time of application for services, was a dichotomous variable taken directly from the

LSVRSP database.

Having worked since the onset of the disability was a dichotomous variable that was a specific measure of work history, which has been found to be related to employment outcomes for consumers of vocational rehabilitation services. The reason for applying for services related to obtaining employment, another dichotomous variable, could be considered a measure of "interest in working," as discussed by Kirchner et al. (1999). Kirchner and Johnson (1997) also called for the consideration of this factor when evaluating competitive employment. This variable was created from two variables in the LSVRSP data set, one obtained from interviews and one obtained from information in the case files. These variables were related to specifying why the consumers applied for vocational rehabilitation services. If the reason given in either of these answers was related to help in getting a job or obtaining job placement services, then this variable was coded yes.

Service-related variables

The receipt of education as a vocational rehabilitation service was a categorical variable with three levels: no education was received; education was received, but no certificate or degree was obtained; and education was received, and an educational certificate or degree (such as a custodial skills certificate, a business school certificate, an associate's degree, or a bachelor's degree) was obtained. The quality of the counselor-consumer relationship was rated by an outside observer as low, average, or high. For this analysis, the low and average ratings were pooled to form a dichotomous variable (high quality versus low or average quality). Unfortunately, the codebook and information provided with the LSVRSP data do not provide specific criteria for how the outside observer made the determination of quality.

Data analysis

Logistic regression was used to analyze the data, employing the LOGISTIC procedure in SUDAAN, Version 9.0, a software package that was designed for the analysis of samples that are obtained through complex sampling designs. SUDAAN allows the user to specify which type of sample design was used, the design stages, and the weight assigned to each person in the data set. Logistic regression is a multivariate technique that allows one to evaluate each variable's impact on a successful employment outcome while holding the other

variables in the model constant. By evaluating the significance of each independent variable in the model, one knows whether a particular variable has a significant impact on the dependent variable when the other variables in the model are controlled.

Logistic regression also allows for the calculation of odds ratios, which are used to compare groups in terms of the response variables. An odds ratio provides information about how two people who are the same on all but one variable will differ, on the basis of that one variable. The odds ratio is a measure of association and is generally the parameter of interest in logistic regression because of its ease of interpretation (Hosmer & Lemeshow, 2000). An odds ratio value greater than 1 for an independent variable indicates that the odds that a person who exhibits that characteristic will obtain the desired outcome (such as a successful employment outcome) are greater than are those for a person who does not exhibit that characteristic. Because of its small sample and the resulting low power, an alpha level of .10 was used for the analysis.

Results

The overall model was statistically significant, Wald Chi squared (13, N = 181) = 71.88, $p < .01$. This Wald Chi squared statistic tested the null hypothesis that none of the independent variables was related to a successful employment outcome. Because the Wald Chi squared value was significant, this null hypothesis was rejected. The Chi squared statistic was also used to test the significance of each individual independent variable (to test the null hypotheses that the regression coefficient for each variable was equal to 0). Four independent variables were found to be significant predictors of whether a person would obtain a successful employment outcome: (1) having worked since the onset of the disability, Wald Chi squared (1, N = 181) = 9.31, $p < .01$; (2) reason for applying for vocational rehabilitation related to obtaining a job, Wald Chi squared (1, N = 181) = 6.31, $p = .01$; (3) the relationship between the counselor and the consumer being rated as high quality, Wald Chi squared (1, N = 181) = 4.30, $p < .05$; and (4) the receipt of education as a service resulting in obtaining an educational certificate or degree, Wald X Chi squared (2, N = 181) = 5.95, $p = .05$. Full statistical results, including odds ratios, of the logistic regression model are reported in Table 2.

Begin Table 2:

Table 2

Statistical results for the logistic regression model of successful employment outcomes.

Description: There are 6 main column heads: Variable, $\hat{\alpha}$, SE of $\hat{\alpha}$, df, Wald X2, Odds ratio (95% CI).

* $p < .10$.

Variable: Gender; $\hat{\alpha}$: 0.61; SE of $\hat{\alpha}$: 0.48; df: 1; Wald X2: 1.57; Odds ratio: 1.83 (0.70-4.82).

Variable: Age; $\hat{\alpha}$: -0.02; SE of $\hat{\alpha}$: 0.02; df: 1; Wald X2: 1.67; Odds ratio: 0.98 (0.95-1.01).

Variable: Has worked since the onset of the disability; $\hat{\alpha}$: 1.30; SE of $\hat{\alpha}$: 0.43; df: 1; Wald X2: 9.31*; Odds ratio: 3.66 (1.56-8.57).

Variable: Level of vision loss; $\hat{\alpha}$: -0.99; SE of $\hat{\alpha}$: 1.06; df: 1; Wald X2: 0.87; Odds ratio: 0.37 (0.04-3.11).

Variable: Receipt of financial assistance; $\hat{\alpha}$: -0.19; SE of $\hat{\alpha}$: 0.46; df: 1; Wald X2: 0.18; Odds ratio: 0.82 (0.33-2.07).

Variable: Has a secondary disability; $\hat{\alpha}$: -0.95; SE of $\hat{\alpha}$: 0.85; df: 1; Wald X2: 1.27; Odds ratio: 0.39 (0.07-2.09).

Variable: Race; df: 2; Wald X2: 0.25.

Variable (Race): White versus black; $\hat{\alpha}$: -0.22; SE of $\hat{\alpha}$: 0.44; df: 1; Wald X2: 0.24; Odds ratio: 0.81 (0.34-1.93).

Variable (Race): White versus other; $\hat{\alpha}$: 0.00; SE of $\hat{\alpha}$: 0.47; df: 1; Wald X2: 0.00; Odds ratio: 1.00 (0.39-2.55).

Variable: Applied for employment help; $\hat{\alpha}$: 1.23; SE of $\hat{\alpha}$: 0.49; df: 1; Wald X2: 6.31*; Odds ratio: 3.41 (1.28-9.08).

Variable: Quality of counselor-consumer relationship; $\hat{\alpha}$: 0.87; SE of $\hat{\alpha}$: 0.42; df: 1; Wald X2: 4.30*; Odds ratio: 2.39 (1.03-5.52).

Variable: Number of years of education; $\hat{\alpha}$: 0.11; SE of $\hat{\alpha}$: 0.09; df: 1; Wald X2: 1.51; Odds ratio: 1.12 (0.93-1.35).

Variable: Education received as a service); df: 2; Wald X2: 5.95*.

Variable (Education received as a service): Not received versus received; $\hat{\alpha}$: -0.13; SE of $\hat{\alpha}$: 0.57; df: 1; Wald X2: 0.05; Odds ratio: 0.88 (0.28-2.73).

Variable (Education received as a service): Not received versus got a degree; $\hat{\alpha}$: 2.24; SE of $\hat{\alpha}$: 0.95; df: 1; Wald X2: 5.54*; Odds ratio: 9.37 (1.40-62.81).

End of Table 2.

The total amount of variance explained by this model (Cox and Snell's R squared) was 28.3%. The four significant variables in the model explained 23.8% of the variance on their own. The fit of the model was assessed with Hosmer and Lemeshow's (2000) goodness-of-fit chi-square test and the ability of the model to classify the respondents correctly on employment outcome. The chi-square value was not significant, indicating a good fit for the model, Chi squared (8, N = 181) = 5.63, $p = .69$. The model was able to classify 70% of the sample correctly, with slightly greater sensitivity (71.9%) than specificity (68.5%). All these results indicate an adequate fit of the model.

Discussion

The results of this study differed from previous findings, probably because additional variables were included in the model. Many variables that have traditionally had a significant influence on employment outcomes (such as gender, age, level of vision loss, the presence of a secondary disability, educational level, the receipt of financial assistance, and race) were not significant when all the variables in the model were taken into account. It should be noted, however, that age would have had a significant effect if the sample had not been limited to only those who were younger than age 66. The variables that were found to be statistically significant in this model had not been found to be significant predictors of successful employment for visually impaired consumers before, although one was similar to significant variables in other research: having worked since the onset of the disability. This variable is a specific example of information about work history, which has been found to be significantly related to employment outcomes (Giesen et al., 1985; Kirchner et al., 1999). The majority of the consumers (56.9%) in this sample had been employed since the onset of their visual impairment. It makes sense that consumers who were able to work after experiencing vision loss were also more likely to obtain competitive employment after receiving vocational rehabilitation services. In fact, the odds of obtaining competitive employment for a consumer who has worked since he or she became visually impaired are more than 3.5 times greater than the odds for a consumer who has not. Thus, when all the other variables in the model were held constant, the odds of becoming competitively employed were greatly increased when a person had held a job after he or she became visually impaired.

Another significant predictor of competitive employment in this model was the receipt of education as a service resulting in an educational certificate or

degree. Prior research has indicated that the receipt of education as a vocational rehabilitation service was associated with successful outcomes for some groups of consumers (Giesen et al., 1985; Moore, 2001). However, in this study, just receiving education as a service did not improve these consumers' chances of obtaining competitive employment. There was virtually no positive effect on successful employment outcomes for those who received education but did not obtain a certificate or degree, since the "no-education" group and the "received education but no certificate or degree" group were similar in the likelihood of their successful employment. These results indicate that only the actual completion of an educational program is valuable to consumers, at least in terms of employment. Kirchner et al. (1999) documented the important effect of having a college degree on employment outcomes for the general population of persons who are blind or visually impaired, with a much higher percentage of those with a college degree being employed. The effect of completing an educational program is powerful because the odds of attaining competitive employment were more than nine times greater for those who obtained an educational certificate or degree compared to those who did not receive education as a service at all.

It seems logical that seeking help from vocational rehabilitation in finding a job would be a significant predictor of obtaining competitive employment. Most of the people in this study indicated that they wanted help with obtaining employment (73.5%). Not all of them achieved this goal, but the odds of obtaining a successful employment outcome were almost 3.5 times greater for those who stated that this was a reason for seeking vocational rehabilitation services than for those who did not. This variable could be considered a rough proxy for motivation for employment or "interest in work," as Kirchner et al. (1999) discussed. Obviously, there would be a great deal of variation in the level of motivation among those who indicated that they wanted help in obtaining employment, but a safe assumption would be that those who reported that they wanted help were more motivated to achieve employment than were those who did not.

The relationship between the vocational rehabilitation counselor and consumer has always been considered important in the vocational rehabilitation process (Garske & Soriano, 1997; Rubin & Roessler, 1987), yet little, if any, evidence existed for this supposition. The results of this study provide support for the importance of this relationship to the successful employment outcomes of vocational rehabilitation consumers. Consumers who had relationships with their

counselors that were rated as high quality had odds of achieving competitive employment that were almost 2.5 times greater than the odds of consumers who had low- or average-quality relationships with their counselors that were rated as low or average quality. One needs to remember that this difference was found when all the other variables in the model were held constant. Therefore, the counselor-consumer relationship alone substantially increases the odds of a successful outcome for consumers and therefore is clearly important to vocational rehabilitation.

Implications for service

The findings of this study were surprising in that many variables that have traditionally been considered to be important in predicting successful employment outcomes were not found to be statistically significant in this model, yet four variables that have not been used in this type of research were found to be statistically significant predictors of successful employment for consumers who are visually impaired. In order of effect size or importance (odds ratio), these variables were (1) receiving education as a service resulting in an educational certificate or degree, (2) having worked since the onset of the disability, (3) reason for applying to vocational rehabilitation related to obtaining a job, and (4) the relationship between the counselor and the consumer rated as high quality. With this sample, which is considered representative of the population of blind and visually impaired consumers of vocational rehabilitation services, these new variables are more closely related to successful employment, and their contribution to the prediction of it overshadows the other variables that have been used in past research.

The findings shed new light on the importance of different characteristics of consumers in terms of the likelihood of their success in obtaining employment. They also provide evidence of the importance of two aspects of vocational rehabilitation services: the receipt of education leading to a certificate or degree and the relationship between the counselor and consumer. Past research has indicated that the provision of education as a service to consumers was associated with better outcomes. Yet the current study did not detect any positive effect on competitive employment of just providing educational services; rather, the receipt of a certificate or degree as the outcome of educational services significantly increased the odds that a person's case would be closed in competitive employment. It is common knowledge that persons with advanced degrees are more likely to be employed, but this category also included those with certificates in such areas as floral design or custodial skills

training. This finding about the value of educational certificates or degrees is important for vocational rehabilitation counselors and administrators to note. It provides justification for counselors to allow consumers to receive training or education that will result in certificates or degrees. Vocational rehabilitation professionals need to realize the importance of permitting and encouraging consumers who want to complete educational or training programs to do so. Of course, some consumers who begin educational training with the goal of completing degree programs may not be able to achieve this goal for personal reasons over which counselors have no control.

The finding that rated the quality of the relationship between counselors and consumers is related to successful employment outcomes is an important discovery. It has long been suspected that this relationship exists, but little evidence of its significance has been available. This finding emphasizes the importance of appropriate training for vocational rehabilitation counselors, including training in counseling skills. It is also valuable for counselors to realize that their relationships with consumers may influence the consumers' employment outcomes. Establishing high-quality relationships with consumers will benefit consumers in many ways and may benefit counselors in terms of greater productivity.

With that stated, it must be acknowledged that the lack of complete information about the rated quality of the relationships between counselors and consumers is a limitation of this research. I did not have access to the specific criteria or instructions that the data collectors used to rate the quality of this relationship. Therefore, the value of this variable cannot be fully determined, and the conclusions that are related to it must be considered with this limitation in mind. However, because these data came from a reliable source and the variable was of interest in determining employment outcomes, it was included in the analysis with that caveat.

Another limitation was the small number of visually impaired consumers who were available for the analysis. Although the LSVRSP is a large database, it includes only 685 consumers who are blind or visually impaired. When restrictions are placed on that sample, as was done in this study, that number becomes even smaller, and the fact that data on all the variables were not available for many of the consumers in the database further reduced the sample size. Because of the small sample size, the results should be interpreted with caution. A replication of the study is certainly warranted due to the sample size issues. An additional

limitation of this study was the fact that all variables that contribute to successful employment outcomes could not be included in the model, partly because of the small sample size and partly because of the lack of variables that would be of interest in the data set. Although this database is the most comprehensive one of its kind available, it still has limitations, particularly when the interest is a subpopulation, such as persons who are blind or visually impaired.

Despite its limitations, the LSVRSP database has great value and should be used for additional research. For example, other service- or vocational rehabilitation-related variables that have a significant influence on employment outcomes should be identified. It is in this area that the field of vocational rehabilitation has the greatest ability to make changes that can increase the rates of successful employment for consumers. Another area that is important to investigate is the long-term effects of vocational rehabilitation on the earnings and employment status of these consumers. With this newly available database, many additional studies can be conducted on vocational rehabilitation outcomes for blind and visually impaired consumers.

References

American Foundation for the Blind. (n.d.). Employment statistics for people who are blind or visually impaired: U.S. [Online]. Available: <http://www.afb.org/Section.asp?SectionID=43&DocumentID=1529>

Dickerson, L. R., Smith, P. B., & Moore, J. E. (1997). An overview of blindness and visual impairments. In J. E. Moore, W. H. Graves, & J. B. Patterson (Eds.), *Foundations of rehabilitation counseling with persons who are blind or visually impaired* (pp. 19-22). New York: AFB Press.

Garske, G., & Soriano, M. (1997). Client perceptions of the rehabilitation counseling relationship: Humanistic approaches and related outcomes. *Journal of Applied Rehabilitation Counseling*, 28(2), 10-14.

Giesen, J. M., & Ford, K. L. (1986). The unsuccessfully closed blind client: Characteristics of a nonemployment outcome (Technical Report). Mississippi State: Mississippi State University Rehabilitation Research and Training Center on Blindness and Low Vision.

Giesen, J. M., Graves, W. H., Schmitt, S., Lamb, A. M., Cook, D., Capps, C., &

Boyet, K. (1985). Predicting work status outcomes of blind/severely visually impaired clients of state rehabilitation agencies (Technical Report). Mississippi State: Mississippi State University Rehabilitation Research and Training Center on Blindness and Low Vision.

Hill, M. A. (1989). Work status outcomes of vocational rehabilitation clients who are blind or visually impaired. *Rehabilitation Counseling Bulletin*, 32, 219-230.

Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression* (2nd ed.). New York: John Wiley & Sons.

Kirchner, C., & Johnson, G. (1997). Research to improve vocational rehabilitation: Employment barriers and strategies for clients who are blind or visually impaired. *Journal of Visual Impairment & Blindness*, 91, 377-393.

Kirchner, C., & Peterson, R. (1982). Vocational and rehabilitation placements of blind and visually impaired clients: U.S., 1980. *Journal of Visual Impairment & Blindness*, 76, 426-429.

Kirchner, C., Schmeidler, E., & Todorov, A. (1999). Looking at employment through a lifespan telescope: Age, health, and employment status of people with serious visual impairment. Mississippi State: Mississippi State University Rehabilitation Research and Training Center on Blindness and Low Vision.

Knowles, L. L. (1969). Successful and unsuccessful vocational rehabilitation of the legally blind (Doctoral dissertation, University of Southern California, 1968). *Dissertation Abstracts International*, 29, 4326A-4327A.

Leonard, R., D'Allura, T., & Horowitz, A. (1999). Factors associated with employment among persons who have a vision impairment: A follow-up of vocational placement referrals. *Journal of Vocational Rehabilitation*, 12, 33-43.

Moore, C. (2001). Disparities in job placement outcomes among deaf, late-deafened, and hard-of-hearing consumers. *Rehabilitation Counseling Bulletin*, 44, 144-150.

Rubin, S. E., & Roessler, R. T. (1987). *Foundations of the vocational rehabilitation process* (3rd ed.). Austin, TX: Pro-Ed.

School of Industrial and Labor Relations, Cornell University Rehabilitation Research and Training Center Program on Employment and Disability. (2003). Longitudinal study of the vocational rehabilitation services program [Data files]. Available: <http://www.ilr.cornell.edu/ped/lsvrsp/application/index.cfm>

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